the four months February, May, August and November, and also mean monthly charts of the North Atlantic for each month, showing the pressures for every five-degree square.

Not only do the charts give information on the numerous meteorological elements such as temperature, wind tracks of storms, rain, &c., but they refer to the depths, temperature at different depths, specific gravity, currents, &c., of the water in this ocean, the magnetic elements for the year 1902, mean ship routes for two seasons of the year, and the distribution and chief hunting grounds of the most important species of whales.

A word further may be said in praise of the reproduction of the maps, which are all neatly and distinctly coloured, and on scales which are sufficiently large for the purposes for which they are intended.

Both the distinguished director of the Deutsche Seewarte and his co-workers are to be congratulated on the completion of this important work, and for their successful efforts in bringing before the world in such a concise form the results of so many observations. British meteorologists and sailors will certainly find this work of great utility, and they, like the present writer, will no doubt appreciate the service that has been rendered by their German confrères at the Seewarte.

W. J. S. L.

THE WANDERINGS OF A NATURALIST.

Aus den Wanderjahren eines Naturforschers, Reisen und Forschungen in Afrika, Asien und Amerika, nebst daran anknüpfenden meist ornithologischen Studien. Von Ernst Hartert. Pp. xiii+329. (Berlin: Friedländer und Sohn; London: Porter, 1901–2.)

A SHORT time ago (NATURE, vol. lxiv. p. 249, July 11, 1901), we called attention to the scientific work carried on at the Tring Museum and to its excellent results as regards the advancement of zoology. In *Novitates Zoologicae*, the organ of that institution, has been lately published a series of articles written by Mr. Ernst Hartert (one of Mr. Rothschild's staff of naturalists, whose name is well known to all zoologists), containing an account of the various expeditions which he has made, in the intervals of a very busy life, to the tropics of three continents. These articles are reprinted in the volume now before us, and are accompanied by some excellent illustrations.

Before noticing this work, we may express some regret that Mr. Hartert did not write it in English, with which language, we believe, he is quite as familiar as with his native tongue. All educated Germans can read English; but it is a fact, we regret to say, that many highly educated Englishmen do not read German with facility, although they may be able to comprehend its general meaning. By writing in English, we believe, Mr. Hartert would have secured a much larger number of readers for his interesting narrative.

Mr. Hartert is so fortunate as to have visited the tropics of Africa, Asia and America in the course of his wanderings—a feat which we suppose few other naturalists have achieved. In April, 1885, he left Hamburg as a volunteer zoologist in company with Flegel's Niger-Benué Expedition, to an account of which the first section of this work is devoted. From Loko, on the Benué, a successful journey to Sokoto and Kano was made across Hausaland, but the talented leader of the expedition lost his life on the way back and others were very sick. Various zoological notes will be found in the text of the narrative of this excursion, and special chapters on the birds of the Canary Islands and of Hausaland are added.

In August, 1887, our author turned his face to a very different part of the earth's surface, and started for Penang and Sumatra, with the object of making entomological collections for the late Dr. Richter's cabinets. The journey was subsequently extended to the attractive island of Salanga, on the coast of the Malay Peninsula, and to the British Protectorate of Perak, where both fauna and flora seem to be of the richest and most varied character. An account of these journeyings, interspersed with zoological notes, and of the return home through British India occupies the second section of our "Naturalist's Wanderings." Special chapters are devoted to an annotated list of the birds of Deli, in Sumatra, where examples of 212 species were met with. In this exuberant avifauna, the hornbills, of which no less than nine species are enumerated, must form an attractive feature.

In the third section of his journal, Mr. Hartert takes us across the Atlantic, and tells us of Venezuela and its islands, which he visited in 1892, accompanied by his wife, who, we have been informed, is an accomplished collector of birds and insects. The principal exploit of the journey was the complete ornithological exploration of the three Dutch Caribbee Islands of Curaçao, Aruba and Bonaire off the coast of Venezuela, of which very little was previously known. Mr. Hartert published his account of this excellent piece of work in the *Ibis* for 1893. He now adds many details about his adventures and experiences of all kinds. He has come to the conclusion—no doubt correct—that, though many West Indian forms are represented in Curaçao and "its satellites," the greater part of their fauna has been acquired from the neighbouring continent.

In the fourth and concluding section of his volume, the author takes us back to Africa, not, however, to the fever-stricken banks of the Niger, but to the wholesome and charming sea-board of Morocco, which, according to Hooker and Ball, will ultimately become one of the finest winter-resorts of the Eastern Hemisphere. It is remarkable that a fresh and wild land so easily accessible to Europeans is not more frequented. Mr. Hartert descants fully upon the birds met with in the vicinity of Mazagan, whence he crossed the sea to Teneriffe and returned home by Madeira.

AN ASPIRING GLACIALIST.

The Cause of the Glacial Period. By H. L. True, M.D. Pp. 162. (Cincinnati: Robert Clarke Company, 1902.)

GEOLOGISTS and physicists have been at their wits' end to discover the cause of the Glacial period. They may now cease from cudgelling their brains—Dr. True, of McConnelsville, O., has finally solved the mystery. The explanation is so simple that all who have meddled

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with the question must be chagrined to think that a solution so obvious should have escaped them. The author tells us that when he

> "first began to read on this subject, he had a preconceived opinion of the cause, which to him seemed so reasonable that he wondered why others had not come to the same conclusion."

Ah, but that is always the way! It is only after the riddle is solved that it seems so simple—but the apparent simplicity of the solution should not detract from the merit of its perspicacious discoverer.

We give, in a few words, Dr. True's inspired "theory":—Up to and during part of the Tertiary period, the earth had so far cooled and the crust had become so thickened that it was just able to support itself.

> "But finally the point was reached when it could sustain it (the pressure) no longer. The last grain of sand broke the camel's back."

Suddenly the floor of the ocean settled down, while the mighty north and south mountain ranges of the globe were ridged up. Concurrently with these movements, the polar regions were elevated into dry land, and their supply of warm water from the south being cut off, the formation of ice-fields forthwith began and finally culminated in the Glacial period. The Arctic lands then existed as plateaus—miles in height—an amount of elevation

> "amply sufficient to produce almost any degree of cold, and also a slope extending several hundred miles, sufficient to account for the motion of the ice in a southerly direction. Here is where the northern elevation, which nearly all geologists say must have accompanied the Glacial period, comes in. The great wonder is that they have not seen what caused it."

It is needless to say that under such conditions the ice continued to accumulate until not only all N. Europe and N. America, "but the whole bottom of the N. Atlantic, as far south as the southern border of the telegraph plateau," were covered with an ice-sheet. While this mighty ice-sheet overwhelmed those regions, N. Asia escaped glaciation. Why? Simply because it was deeply submerged at the time, and so the polar ice advancing southwards broke off in icebergs and floated over north and south Siberia. The withdrawal of so much water from the ocean and the piling of it up in the form of ice on the western hemisphere naturally disturbed the earth's equilibrium. We should not be surprised, therefore, to learn that all of a sudden the earth "tipped" or "toppled over," in order to bring about "a readjustment of matter to the stationary axis."

> "N. America and W. Europe moved down out of the cold region, while N. Siberia, on the opposite side of the earth, moved up into it."

Of course, these changes produced a cataclysm—"great tidal waves, perhaps miles in height," sweeping the ice-sheet out of the N. Atlantic and flooding much of the continents.

And so the Glacial period came to an end in N America and Europe. But, as our author remarks,

> "it is plain that when the west side of the earth warmed up, the east side became cold, and it is also plain that the transition was sudden."

This is shown by the admirable preservation in N. Siberia of the carcasses of mammoths and woolly rhinoceroses—" the congeners of those now inhabiting a tropical climate."

> "It seems that when the east side of the earth tipped northward, the reaction caused a great tidal wave that caught the animals which roamed over the regions south of and adjacent to the then northern ocean, and carried them away as drift, to become frozen in ice, and there they have remained ever since."

Who will not sympathise with glacialists? Their occupation, alas! is gone; no more difficulties are left for them to encounter; with a wave of his magic pen, our inspired doctor has banished darkness and laid bare every secret of the Ice Age. He knows the past of our globe so well that one cannot wonder he should be equally confident as to its future. His theory is a true "open sesame." The same succession of remarkable changes which he has unveiled for us will, we are assured, again supervene; and his readers may well shiver and shudder at the "gloomy picture" he presents for their contemplation. They are advised, however, by the considerate author not to be "uneasy" because of that dismal future—it is still a long way ahead. "They will not be here when it comes." J. G.

PROPERTIES OF MATTER.

A Text-Book of Physics. By J. H. Poynting, Sc.D., F.R.S. and J. J. Thomson, M.A., F.R.S. Properties of Matter. Pp. vi+228. (London: C. Griffin and Co., Ltd., 1902.)

THIS volume is to be regarded as the opening one of a series forming a text-book of physics, of which the second part, namely, "Sound," was published some two years ago and is now in its second edition. The remaining volumes, dealing with "Heat," "Magnetism and Electricity," and "Light," will be published in succession, it may be hoped at somewhat shorter intervals.

The book is not intended for elementary students on the one hand or for mathematicians on the other, and the authors make a welcome innovation in entirely omitting the more purely mathematical side of mechanics with which text-books on the properties of matter are usually encumbered. After a brief preliminary chapter dealing with the experimental evidence for the constancy of weight and mass, about fifty pages are devoted to a most interesting and complete account of the experimental work on the measurement of the acceleration of gravity, the figure of the earth and the constant of gravitation, introducing the student to a number of most instructive physical methods, described with the discrimination of a practised experimentalist who has made a special study of the subject. The next seven chapters (60 pp.) deal with the elasticity of solids from an experimental standpoint, mathematics being introduced only so far as is necessary to permit a comparison of theory and observation in a few simple cases, which serve to illustrate the physical principles involved. Many comparatively recent experiments are described, such as those of Ewing on the yielding of crystalline substances by slipping along the cleavage planes. The remainder of

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